BIDD STEEL FABRICATORS INC.

"Building a Better Tomorrow"

Expansion Proposal

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An Executive Summary

BIDD Steel Fabricators provides unparalleled quality and service to the steel bridge industry in the province of Alberta. With over 10 years of experience in bridge design and fabrication BIDD has built a strong relationship with owners, engineers and general contractors.

With the current downturn in the economy the Federal and provincial governments are increasing spending on Infrastructure. Projected bridge projects for the next five years include two P3 (Public Private Partnership) ring road projects and 10 conventional design-bid-build projects.

To meet current and projected demand for bridge girders in Alberta as well as neighboring provinces BIDD Steel Fabricators is looking into the future and the possibility of growth and improvement in production.

We will use a decision tree to evaluate the capacity investment alternatives and as lean manufacturing is a factor in this decision tree we will discuss how it can affect the capacity of the shop.

Relevant Company Information

BIDD Steel Fabricators started in 2000 and is an industry leader in the fabrication of steel bridge girders. We currently supply, fabricate and erect steel bridge girders to construction firms in the province of Alberta. Our office and fabrication facility is located in Acheson Alberta and is 20000 sqf with a weekly capacity of approximately 80 tons or 2 girders. BIDD Steel Fabricators employs approximately 20 quality tradesmen and an elite management team of engineers and project managers.

BIDD's services are provided not only through traditional design-bid-build contracts but recently through design-assist and design build arrangements where BIDD Fabricators' experiences are utilized to provide early and overall cost-savings and advantages to projects.

With recent changes at BIDD Fabricators we are reinforcing our focus on quality and customer service with the implementation of the ISO 9001 Quality Management System. We also adhere to the CISC Code of Standard practice and AIT specifications for Bridge construction.

Issue Identification

As the bridge building industry has become extremely busy in the past several years, and with major road construction being budgeted by the Government of Alberta in the coming five years, we at BIDD Steel Fabricators are looking at a very large and active market for our bridge division in the foreseeable future. Certainly in the next 5 years we will exceed our plants production capabilities in both capacity and physical space.

With this looming shortfall occurring at a time of unprecedented growth throughout Western Canada, we must examine the forecast requirements and compare those to our capabilities. Having reached a current production level of 80% of plant capacity during the recent economic boom, we now have evidence of what our company is capable of producing with the current equipment and facility.
A project management group has been formed for the sole purpose of identifying expansion and increased capacity opportunities. After considering all options, we have identified three paths that BIDD Steel Fabricators may choose to undertake and the investment/return on each.

Definition / Application

The first path is that of continuing our operations without any changes to personnel, production equipment or facility. Although, monetarily, this is risk free it also will ensure that BIDD Steel Fabricators will be limited in both the size of the projects and products that can be produced. This will have a strong limiting factor on growth and hence future profit.

The second scenario calls for a number of issues to be looked at in the current facility. These include a renovation of the existing runway and building and implementing lean manufacturing. Issues such as buffering, blocking and bottlenecks have been identified and may bring improved performance if corrected. The cost of these renovations and changes in process have been examined and have an implementation price of approximately 5.5 million dollars while yielding an anticipated production increase of somewhere between 30-40% depending on the amount and success of implementation.

The third avenue being presented is that of an expansion of a new facility. Preliminary indications are that with an addition of a larger facility than our present plant, including a second crane runway and

two additional 35 ton overhead cranes, our production levels would increase between 85 and 100%. While these levels are unattainable with the present facility and process, it would come at an estimated cost of $30 million. With the projected revenue increase of 50%, strong workload demand for the foreseeable future and already having the required space available at our present location, this may be a move that would ensure the growth of BIDD Steel Fabricators.

Our team has prepared a decision tree containing data on the three proposed possibilities. See Figure 1.1 The Decision Tree.

Figure 1.1 The Decision Tree

BIDD Manufacturing Expansion Proposal							
12 Million/year current as baseline							
	Growth %	***Revenues***	***5 Year***	***Costs***	***5 year Projected Revenues less Cost of Expansion***	***Yearly***	***% Increase***
Expansion	Strong 100	24	120	30	90	18	50
Cost Makeup	Weak 85	22.2	111	30	81	16.2	35
(New Facility, doubling of Capability)					Value of Expansion		
					(18 x 1) + (16.2 x.85) = 31.77		
Lean Mfg / Renovation	Strong 50	18	90	5.5	84.5	16.9	41
Cost Makeup consists of 5.5M in plant reworks	Weak 40	16.8	84	5.5	78.5	15.7	31
(Building 3.5M, Runways 0.5M, Cranes 1.5M)					Value of Lean Mfg./ Renovation		
					(16.9 x .5) + (15.7 x .4) = 14.73		
Status Quo.	Strong 5	12.6	63	0.5	62.5	12.5	4.2
Cost Makeup of Current costs + 10%	Weak 2	12.24	61.2	0.5	60.7	12.14	1.2
					Value of Normal Operations		
					(12.5 x .05) + (12.14 x .02) = .87		

To qualify the decision to expand and implement lean production one has to look at what lean production is. Lean production refers to a focus on eliminating as much waste as possible. Moves that are not needed, unnecessary processing steps and excess inventory in the supply chain are targets for improvement during the leaning process. This leaning process requires an analysis of the current operation. Value-Stream mapping is a tool that outlines the value-adding and the non-value adding activities from the start of production of a girder to completion of the girder. To identify waste throughout the fabrication process one has to understand seven elements that do not contribute to the value of a product and how these elements are present: Overproduction, Inventory, Transportation, Waiting and motion, Over-processing and Correction or re-work.

Transportation is a non value adding activity but is unavoidable as the materials used for bridge fabrication are not available at local steel warehouses. There are three main suppliers of the special weathering steel (Grade 350AT) required, two are located in the US and one in Ontario. Plate orders require a 6 to 8 week lead time for rolling and shipping. Typically plate is loaded on a rail car and shipped to Edmonton where they are then transferred onto trucks and delivered to the shop.

When the plate arrives by truck at the shop it is offloaded and stacked in the yard under the overhead cranes. Although inventory is not part of the lean process, because of the ordering and shipping costs and quantities required for a bridge the plate for the entire bridge project in ordered, delivered and put into stock. There is also some other stock plate from previous orders and drops. Drops refer to the extra plate cut from an original ordered plate and can be used for other rush jobs or rework. The size of plates typically ordered from the steel mills are 2m to 2.8m wide by 20m to 24m long depending on the thickness of plate required by design. This is why the weathering steel plate is ordered only when a job has been awarded and not on speculation.

At the start of the current fabrication process all the flange plates required for the entire bridge are batch cut. This inventory of finished cut flange plates are stacked and stored on the shop floor while the rest of the cutting is completed. This overproduction of plates creates inventory but is necessary because once all the plates have been cut the cutting table is moved due to the lack of shop space available. With the cutting table moved out the welded splicing begins and continues until all the splices of the flanges are complete. Once completed all the welds are required to be tested by a Third Party. Due to the nature of this testing (x-ray) the welded plates are required to be moved outside. As there is not enough space to lay all the flanges down for testing at one time when the first set of

flanges have been tested and stacked the next set are laid out and tested. When the testing is complete the last set of flange plates are stacked and brought back into the shop and are ready for the assembly process stage in fabrication.

The web plates for the girders go through the same process of offloading, stacking, moving into the shop for cutting and welding, moving out for inspection and then back in for assembly with the flange plates.

If there are any welded splices that do not pass inspection they will have to bring the plates back into the shop for rework or correction. This rework to the flanges or webs will delay the next stage in the fabrication process. If there are any mistakes made that affect the material to a point where it cannot be used we would have to re-order the plate which would be a minimum 6 to 8 week delay.

Waiting and motion exist in the shop because there is not a balance from the cutting and welding of the plates stage to the assembly stage. Extra handling of material between these stages is required due to the shortage of shop space.

Over-processing is another element that does not contribute to the value of a product. As a relatively small fabricator we have to this point not invested in any new technology or equipment for cutting, fitting and welding processes eliminating the need to increase production in any certain area to recover any investments.

Now that some of the elements of waste have been identified the first step in developing the future state of lean production is to calculate takt time. Takt time is equal to the available hours / customer demand. The Value-Stream Map (Figure 1.2) is based on a Takt time of 4 shifts per girder or one girder fabricated every two days. This is the same number of girders fabricated used to project the estimated revenue in the decision tree for the renovation / leaning option. The importance of Takt time is to produce one girder just in time to replace the previous girder just completed. With the planned extension and new design in plant layout the work flow will be better balanced to have a minimum of work-in-process and as close to one piece flow as possible.

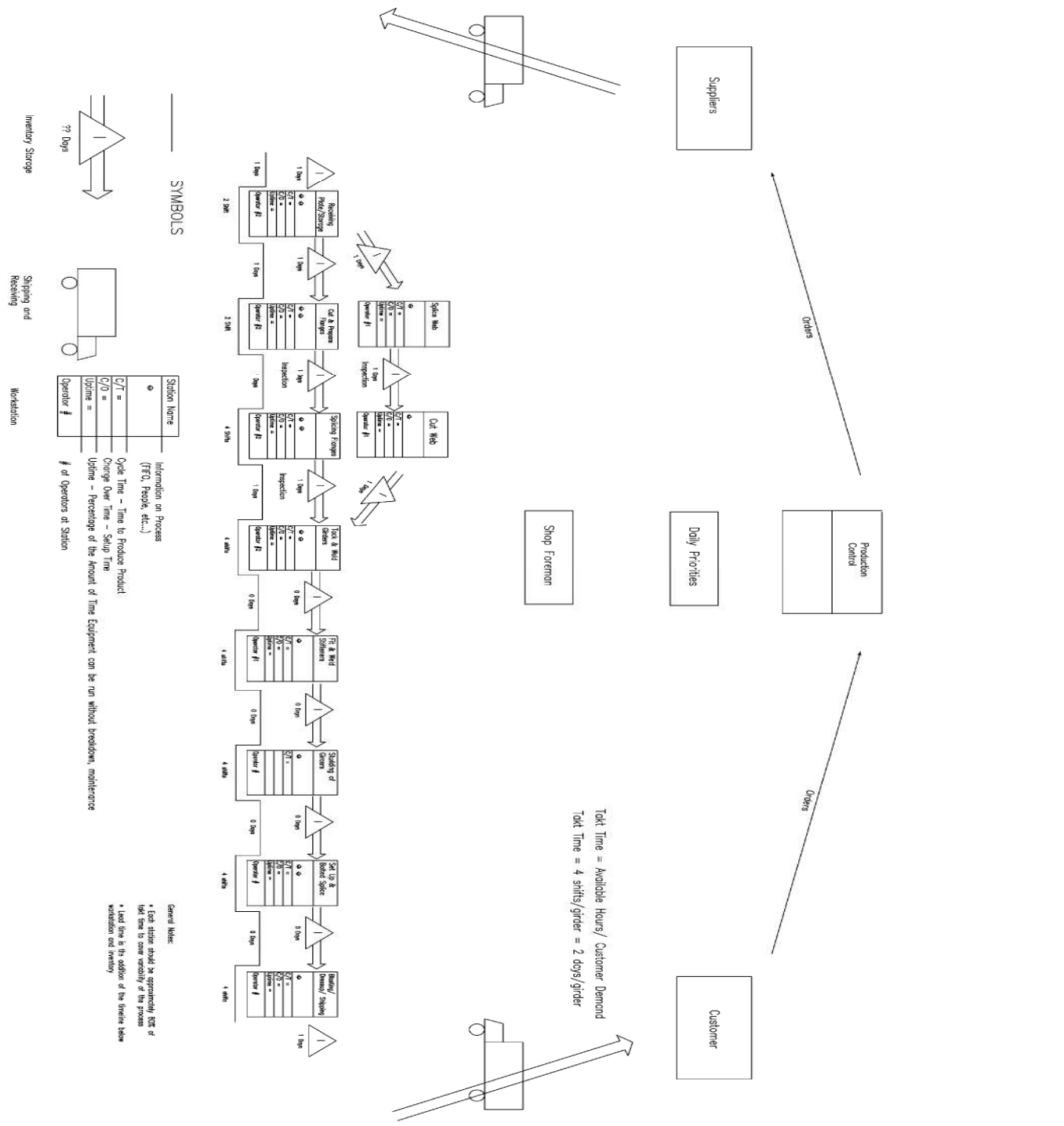
One piece flow is possible throughout the fabrication process because the shop space will then be available to produce only the number of units required for the next stage of production per shift. There

won’t be a need to cut all the flange and web plates ahead of time as the floor space is available to lay out and weld the cut plates immediately. The need to wait for the cutting table to be moved is no longer necessary. Though the run time for the process has not changed the reduction in the operation time has been optimized as there isn’t any set up time or waiting between processes as they now run simultaneously / parallel in two areas. Once the material has gone through the inspection stage after the splicing of the plates we will have a continuous flow where the run time in each stage is equal.

As shown in the new value stream map (Figure 1.2) there is still one area where there is a buildup of inventory. The cutting and preparing of the flanges as well as the splicing of the webs the run time is 2 shifts. Although there has been an improvement in the flow and set up time of girders in the shop there are still areas to improve. By identifying that there will still be inventory between two stages the different processes will have to be looked at to further increase production and capacity.

Looking at the decision tree and the initial capital to expand into a new facility compared to that of the renovation and leaning a decision has been made to renovate and extend the existing runway and shop. With the mapping complete and the decision made an action plan will be developed. This plan will be used to implement the changes from the existing shop and process to the expanded shop and lean process. This is the first stage that BIDD steel Fabricators will go through. Once the expansion is complete and operating a second value stream will be mapped to see how the original is performing. This will also show where more improvements can be made to increase efficiency and capacity. The increase in capacity would overall increase our possible sales and revenue.

Figure 1.2 The Value Stream Map



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